CLAIMS

What is claimed is:

1. A fiber comprising:

a first medium, exhibiting electromagnetic induced transparency; and

a second medium, wherein the first and second mediums form a fiber having a photonic band gap structure.

2. The fiber according to claim 1, wherein the fiber is a waveguide.

3. The waveguide according to claim 2, wherein the first medium has a low first frequency signal transmission and where illumination of the waveguide by a second frequency signal increases the transmission of the first frequency signal.

4. The waveguide according to claim 2, wherein empty chambers are formed in the second medium.

5. The waveguide according to claim 4, wherein the chambers are filled with fluid forming the first medium, the first medium having EIT effects at a coupling frequency.

6. The waveguide according to claim 4, wherein the chambers are filled with a gas forming the first medium, the first medium having EIT effects at a coupling frequency.

7. The waveguide according to claim 6, wherein the gas is pressurized.

8. The waveguide according to claim 3, wherein the waveguide produces dispersion altering characteristics on the first frequency signal.

9. The fiber according to claim 1, wherein the second medium is made of glass.

10. An optical switch comprising:

a PBG fiber, wherein the PBG fiber has a first medium exhibiting electromagnetic induced transparency and a second medium, wherein the first and second mediums form a fiber having a photonic band gap structure;

an input, wherein said input accepts a switching signal and a first signal; and

an output, wherein said output transmits a portion of the first signal in response to the switching signal.

11. The optical switch according to claim 10, wherein the first medium has a low first signal transmission and where illumination of the PBG fiber by the switching signal increases the transmission of the first signal from the output.

12. The optical switch according to claim 10, wherein empty chambers are formed in the second medium.

13. The optical switch according to claim 12, wherein the chambers are filled with fluid forming the first medium, the first medium having EIT effects at a coupling frequency.

14. The optical switch according to claim 12, wherein the chambers are filled with a gas forming the first medium, the first medium having EIT effects at a coupling frequency.

15. The optical switch according to claim 14, wherein the gas is pressurized.

16. The optical switch according to claim 11, wherein the optical switch produces dispersion altering characteristics on the first signal.

17. The optical switch according to claim 10, wherein the second medium is made of glass.

18. The optical switch according to claim 10, wherein the optical switch is used to perform a Boolean operation, where the input of the first signal without the switching signal corresponds to a low transmission of the first signal from the output corresponding to a logical value "0" and the input of the first signal and the switching signal corresponds to a higher relative transmission of the first signal from the output corresponding to the logical value "1."

19. A method of selecting transmission of a signal comprising:

passing a transmission signal into a fiber, the fiber having a photonic band gap structure, and exhibiting electromagnetically induced transparency in a transparency frequency width W when illuminated by a coupling signal having a coupling frequency, the transmission signal having a frequency within the width W;

passing a switching signal thru the fiber; and

selecting the transmission signal for transmission thru the fiber, where the selecting occurs by setting the switching signal's frequency to the coupling frequency.

20. The method according to claim 19, wherein the switching signal and transmission signal frequencies lie in a pass band frequency range of the photonic band gap structure.

21. The method according to claim 20, wherein a plurality of signals are selected to pass through the waveguide as transmission signals.

22. A method of making an EIT supportive photonic fiber comprising:

extruding through a die a material comprising at least one glass powder and a binder to form a body having a first face spaced apart from a second face, each face having an area, wherein a plurality of channels extend from the first to

the second face and form openings in the respective faces, the channels separated one from another by intervening walls which have a cross section, the cross section of the walls serving to separate the array of openings, one from another, in the respective faces;

heating the body to drive off the binder and viscously sinter the glass powder to form a glass body;

drawing a glass fiber or rod from the glass body forming channels in the glass body;

filing the channels with a medium that exhibits EIT when illuminated by a coupling laser of wavelength λ_c; and

sealing the channels.

23. The method of claim 22, wherein the channels form a periodic array of chambers isolated within the glass.

24. The method of claim 22, wherein the medium is fluid.

25. The method of claim 22, wherein the medium is gas.

26. The method of claim 22, wherein the chambers are formed by heating at periodic spacings along the waveguide causing reflow closing the channels at periodic locations forming the periodic array of chambers.

27. The method of claim 22, wherein the chambers are formed by periodic placement of a sealant substance in the channels, where upon heating, the sealant substance forms sealing walls of the chambers.